World quail. Their current distribution suggests that dispersal followed speciation. Because the genetic variation found in this group may reflect local adaption, the effect of translocation and stocking of pen-reared quail on local population genetic structure must be critically examined.

134. Gutiérrez, R. J., R. M. Zink, and S. Y. Yang. 1983. Genic variation, systematic, and biogeographic relationships of some galliform birds. Auk 100:33-47.
Abstract: Starch gel electrophoresis was used to evaluate levels and patterns of genic differentiation among 10 species of galliform birds in the Phasianidae (9) and Tetraonidae (1). The phasianids included an Old World quail, a partridge, a pheasant, and six species of New World quail. Measures of within-species genetic variation included heterozygosity, percentage polymorphic loci, and number of alleles per polymorphic locus. These values were similar to but lower than those reported for other birds. Genetic distances among conspecific populations and among congeneric species were low compared to other avian results. Genetic distances among noncongeners both within and between families were considerably higher, however, than those reported for passerine birds. Thus, more studies of levels of genic differentiation among nonpasserines are required to complement the literature on genic divergence among passerines and to enable us to make general statements about genic evolution in birds. Phenograms and phylogenetic trees suggested that *Phasianus colchicus*, *Tympanuchus pallidicinctus*, *Coturnix coturnix*, *Alectoris chukar*, and the New World quail (Odontophorinae) are genically distinct taxa. The branching sequence among the non-Odontophorinae taxa is unresolved by our data. The branching order among taxa in the Odontophorinae from a common ancestor is: *Cyrtonyx montezumae*, *Oreortyx pictus*, *Colinus virginianus*, *Callipepla squamata*, *Lophortyx gambelii*, and *L. californicus*. The genera *Cyrtonyx*, *Oreortyx*, and *Colinus* are clearly distinct from *Callipepla* and *Lophortyx*, which are quite similar to each other genically. We use a fossil species from the mid-Miocene of Nebraska to calibrate our genetic distances. We estimate dates of divergence of taxa in the Odontophorinae and offer a hypothesis on their historical biogeography. Our analysis suggests that three east-west range disjunctions could account for the origin of *Oreortyx* (12.6 MYBP), *Colinus* (7.0 MYBP), and *Callipepla-Lophortyx* (2.8 MYBP). We suggest that *L. californicus* and *L. gambelii* should be considered distinct species because of an apparent lack of panmixia in zones of sympatry, even though the D between them is typical of that found between subspecies of other birds. *Oreortyx* and *Colinus* should remain as distinct genera, while our data are equivocal on the status of *Callipepla* and *Lophortyx*.

135. Hanna, W. C. 1924. Weights of about three thousand eggs. Condor 26:146-153.
Notes: Table shows *Oreortyx p. plumifera* with 25 eggs weighed, average weight of 10.41 grams, and the tabluated individual weights of all 25 eggs.

136. Hebard, F. V. 1949. Birds of the Fremont National Forest, south-central Oregon. Condor 51:151. **Excerpt**: *Oreortyx picta*. Mountain Quail. Pair in Goose Lake Valley, July 4, 1948.

137. Heekin, P. E. 1991. Movements, habitat use, and population characteristics of mountain quail in west-central Idaho. Unpubl. Res. Proposal, Department of Fish and Wildlife Resources, Univ. Id., Moscow. 64pp. **Abstract**: Mountain quail (*Oreortyx pictus*) numbers in Idaho have been declining over the past several decades. As a result, the species has been classified as a "Species of Special Concern" by the Idaho Department of Fish and Game (IDFG), and the Bureau of Land Management (Idaho BLM) and Region 4 of the U.S. Forest Service (USFS) have designated the mountain quail as a "Sensitive Species" (Moseley and Groves 1990). The mountain quail has also been included on the list of "Wildlife Species of Concern in Idaho" by the Boise Area Office of the U.S. Fish and Wildlife Service (Boccard 1980). Consequently, land and wildlife management agencies, such as the IDFG and the Idaho BLM, have identified the need to collect information on the ecology of mountain quail in Idaho in order to develop management strategies that will prevent further decline in numbers and restore birds in appropriate areas. Various aspects of mountain quail ecology have been studied in California; however, the habitat in California is significantly different than mountain quail habitat in Idaho. No in-depth study has been conducted on the habitat use patterns, movements, and population characteristics of Idaho mountain quail. Such a study is needed before managers can adequately assess the impacts of land use practices on mountain quail habitat and populations. The study area will include several tributaries within the lower Salmon River and Little Salmon River drainages in the southwest corner of Idaho County, Idaho. The objectives of this study are: to document the daily and seasonal movements and home ranges of mountain quail; to collect information on productivity and survival rates; to document habitat use patterns; to determine the physical and vegetal characteristics of nesting and brood-rearing habitats; and to develop recommendations designed to maintain or enhance mountain quail habitat and populations. Field seasons will last from January through August in 1992 and 1993.

138. Heekin, P. E. 1993. Radio-telemetry reveals secrets of mountain quail in Idaho. Quail Unlimited Mag. 12(2):8-11. **Notes**: This article discusses the declining populations of mountain quail in Idaho and includes a synopsis of the author's current study being conducted in the Little Salmon River area, Idaho. A brief description of the study area, trapping efforts, data collection, and some preliminary results are included. The author also includes observations of a mountain quail laying three eggs in a ruffed grouse nest and of a female mountain quail associated with two separate nests.

139. Heekin, P. E., R. Guse, C. Connell, K. P. Reese, and P. Zager. 1993. Mountain quail ecology: mountain quail habitat use, movements, productivity, and survival.

Job Prog. Rep. Proj. W-160-R-20. Id. Dept. Fish and Game, Boise. 15pp. **Excerpt**: Mountain quail (*Oreortyx pictus*) numbers in Idaho have been declining over the past several decades. As a result, the species has been classified as a "Species of Special Concern" by the Idaho Department of Fish and Game; the Bureau of Land Management in Idaho and Region 4 of the U.S. Forest Service have designated the mountain quail as a "Sensitive Species" (Moseley and Groves 1990). The mountain quail has also been included on the list of "Wildlife Species of Concern in Idaho" by the Boise Area Office of the U.S. Fish and Wildlife Service (Boccard 1980). Consequently, land and wildlife management agencies, such as the Idaho Department of Fish and Game and the Bureau of Land Management, have identified the need to collect information on the ecology of mountain quail in Idaho in order to develop management strategies that will prevent further decline in numbers and restore birds in appropriate areas. Various aspects of mountain quail ecology have been studied in California; however, the habitat in California is significantly different than mountain quail habitat in Idaho. No comprehensive study has been conducted on the habitat use patterns, movements, and population characteristics of Idaho mountain quail. Such a study is needed before managers can adequately assess the impacts of land use practices on mountain quail habitat and populations. The study area includes several drainages and draws off the Little Salmon River in the southwest corner of Idaho County, Idaho. The objectives of this study are: to document the daily and seasonal movements and home ranges of mountain quail; to collect information on productivity and survival rates; to document habitat use patterns; to determine the physical and vegetal characteristics of nesting and brood-rearing habitats; and to develop recommendations designed to maintain or enhance mountain quail habitat and populations.

140. Heekin, P. E., and K. P. Reese. 1995. Validation of a mountain quail survey technique. Id. Power Company, Boise. 49pp. **Abstract**: For the past several decades, mountain quail populations throughout the Intermountain Region of the U.S. have been declining. As a consequence, managers have become concerned about the possibility of extirpation of remnant populations. However, because so few studies have been done on the species, information that would enable managers to develop effective management plans is unavailable. As a first step toward collecting more information on the species, managers have expressed a need for an economical and efficient means of surveying mountain quail. Mountain quail are a species of special concern. They exhibit secretive behavior, exist in low densities, and occur in isolated patches of dense cover in steep terrain. Therefore, a species-oriented calling survey, in targeted habitats, would be the most efficient way to begin gathering data on their presence. We determined that a modified calling survey, in which imitated calls are used to stimulate quail vocalizations, might be the most efficient survey method, as presentations designed to elicit responses might increase the likelihood that quail will be detected when present. The purpose of this study was to use the known presence of radio-collared mountain quail to determine the efficacy of such a calling survey, as well as

determine optimum conditions and number of visits for such a survey. During May 1994, we conducted calling surveys in 5 areas in the Little Salmon River Canyon, in west-central Idaho. Surveys were conducted during 4 time periods, using 2 calls, and 2 broadcasting methods. At least 1 radio-collared mountain quail was present in each area throughout the survey period. We found that more vocalizations were detected in the 2 earliest time periods (starting at sunrise or 1000), under mild weather conditions (no precipitation and little or no air movement). When surveys were done under these conditions, and routes were visited at least twice, the presence of mountain quail was detected in 4 of 4 draws. We believe that the survey recommendations presented here will be useful for detecting the presence of mountain quail in targeted areas, and that this type of survey is the most efficient method available in terms of time and labor costs. Results of these surveys may document the presence of mountain quail, establish the location of breeding range, yield information on cover type associations, and provide information on regional distribution. In addition, annual surveys could provide data on population trend and range expansion or contraction. Thus, mountain quail calling surveys can prove a valuable first step toward increasing our knowledge of the species' population dynamics and habitat requirements.

141. Heekin, P. E., K. P. Reese, and P. Zager. 1994. Fall/winter mountain quail ecology: mountain quail fall and winter habitat use, food habits, movements, and population characteristics in north-central Idaho. Job Prog. Rep. Proj. W-160-R-21. Id. Dept. of Fish and Game, Boise. 9pp. **Abstract**: Study plan implementation over the reporting period involved searching for and obtaining permission to set up trapping sites, trapping and radio-collaring birds on winter range, following their daily and seasonal movements, and locating nests. We trapped 28 mountain quail, and radio-collared 27. The birds' movements were monitored from mid-February through the end of the reporting period. As of 8 June 1994, over 110 radio-locations had been completed and 17 nests had been found. Between July and December 1994, we will collect information on nest success, movements, productivity and survival, and habitat use. In August we will trap coveys to collect information on survival and to radio-collar additional birds and renew radio-collars on recaptured birds.

142. Heekin, P. E., K. P. Reese, and P. Zager. 1994. Mountain quail ecology: mountain quail habitat use, movements, productivity, and survival. Completion Rep. Proj. W-160-R-21. Id. Dept. of Fish and Game, Boise. 3pp. **Abstract**: Field work on this project was completed in August 1993. Previous reports (Heekin et al. 1992, Heekin et al. 1993) provided introductory information and summarized results of the 1992 and 1993 field seasons. During this reporting period I completed additional coursework, entered data, and participated in communications activities. I also began field work on the fall/winter ecology of mountain quail (Heekin et al. 1994). During the next several months I will analyze the data and write the thesis, which will serve as the final report, and will be submitted in February 1995.

143. Heekin, P. E., M. Sands, C. Connell, and P. Zager. 1992. Mountain quail ecology: July 1, 1991 to June 30, 1992. Proj. W-160-R-19. Id. Dept. of Fish and Game, Boise. 15pp. **Abstract**: Mountain quail (*Oreortyx pictus*) numbers in Idaho have been declining over the past several decades. As a result, the species has been classified as a "Species of Special Concern" by the Idaho Department of Fish and Game; the Bureau of Land Management in Idaho and Region 4 of the U.S. Forest Service have designated the mountain quail as a "Sensitive Species" (Moseley and Groves 1990). The mountain quail has also been included on the list of "Wildlife Species of Concern in Idaho" by the Boise Area Office of the U.S. Fish and Wildlife Service (Boccard 1980). Consequently, land and wildlife management agencies, such as the Idaho Department of Fish and Game and the Bureau of Land Management, have identified the need to collect information on the ecology of mountain quail in Idaho in order to develop management strategies that will prevent further decline in numbers and restore birds in appropriate areas. Various aspects of mountain quail ecology have been studied in California; however, the habitat in California is significantly different than mountain quail habitat in Idaho. No comprehensive study has been conducted on the habitat use patterns, movements, and population characteristics of Idaho mountain quail. Such a study is needed before managers can adequately assess the impacts of land use practices on mountain quail habitat and populations. The study area includes several drainages and draws off the Little Salmon River in the southwest corner of Idaho County, Idaho. The objectives of this study are: to document the daily and seasonal movements and home ranges of mountain quail; to collect information on productivity and survival rates; to document habitat use patterns; to determine physical and vegetal characteristics of nesting and brood-rearing habitats; and to develop recommendations designed to maintain or enhance mountain quail habitat and populations. The 1992 field season, January through August, included several phases of activity: searching for populations of mountain quail, trapping and measuring birds, radio-tracking, and habitat work. During January and February, over 40 drainages, sub-drainages, draws, and associated slopes in the Little Salmon and lower Salmon River canyons were searched for populations of mountain quail. Thirty-three funnel traps were set up, and between January and April, 1992, 66 mountain quail were trapped, banded, weighed, and measured. Of those, 42 quail were radio-collared. The birds' movements were monitored from March through August, and 11 nests were located. During July and August, physical and vegetal measurements were taken at all nest sites, selected brood sites, random dependent sites associated with used sites, and random independent sites, for a total of 66 habitat plots completed. The availability of given habitats will be compared against the proportion of use they receive. Chi-square goodness of fit, t-tests, linear regression, and nonparametric procedures will be used in analysis of the data.

144. Heekin, P. E., C. A. Vogel, and K. P. Reese. 1994. Uncovering the elusive habits of mountain quail in Idaho. Quail Unlimited Mag. 13(3):14-16. **Notes**: The article provides an update on the Riggins, Idaho, research project since 1993.

Information is provided on trapping, radio-tracking, nest sites, seasonal movements, and how weather conditions can affect mountain quail.

145. Hemker, T., A. Sands, and E. Robertson. 1992. Status of mountain quail in the intermountain west. Unpubl. Rep. 3pp. **Abstract**: Mountain quail (*Oreortyx pictus*) numbers in inland areas of Washington, Oregon, Idaho and Nevada have declined dramatically during the last 20-30 years. In Idaho, distribution of this bird has declined by over 90% and the season closed on this once common species in 1984 after harvest dropped by about 96% from the 1950's to 1970's. As a result, this species has received increased management attention from sportsmen and management agencies and is currently listed as a "Sensitive Species" by the U.S. Forest Service and BLM. Existing data suggest that declines in these mountain quail populations are related to losses of riparian habitat quantity and quality. Current research and management efforts are outlined.

146. Henry, D. P. 1931. Species of coccidia in chickens and quail in California. Univ. Calif. Publ. Zool. 36:156-170.

147. Henshaw, H. W. 1874. Report on the ornithological collections made in portions of Nevada, Utah, California, Colorado, New Mexico, and Arizona, during the years 1871, 1872, 1873, and 1874. Pages 133-507 in Wheeler's Rep. Geogr. and Geol. Expl. and Surv. West 100th Meridian. Vol. 5, Zoology. **Excerpt**: It seems nowhere to be an abundant species. The bevies are very small, and I do not remember to have ever seen more than fifteen together, oftener less. It is a wild, timid bird, haunting the thick chaparral-thickets, and rarely coming into the opening. When a band is surprised they are not easily forced on the wing, but will endeavor to find safety by running and taking refuge in the thickness and impenetrability of their favorite thickets. If forced, however, they rise vigorously and fly swiftly and well, and sometimes to a considerable distance, and then make good their escape by running. During the heat of midday, they will be found reposing under the thick shade of the chaparral, and there they remain till the cooler hours invite them to continue their quest for food.

148. Hoffman, D. M. 1973. Study of mountain quail adaptability. Pages 237-250 in Job Prog. Rep., Fed. Aid Proj. W-37-R-26, WP15, J2. Colo. Div. Game, Fish and Parks, Denver. **Abstract**: A total of 574 mountain quail were released in 2 different areas of Colorado from 1965 through 1973. Of these, 372 were wild-trapped birds received from California and Oregon in wildlife trades and 202 were pen-raised at the Fort Collins Wildlife Research Station. By area, 397 were released in Mesa County on the west side of the Uncompahgre Plateau and 177 were released in Las Animas County on the Spanish Peaks Management Area. One confirmed movement of 25 airline miles distance from a release site was recorded after three mountain quail were confiscated from hunters in Mesa County by Gary Myers. Other reported movements of 15, 7, 3.5, 3 and 1 miles from release sites were recorded during the period 1966 through 1972. The status of

mountain quail in Colorado is very questionable because (1) numbers observed and reported since 1966 have been small relative to numbers released, (2) no instance of reproduction has been recorded, and (3) consistent observations for any one locality are lacking. The probability that the species will become established in Colorado is slim. Game farm propagation of mountain quail was terminated and all remaining stock released on March 20, 1973.

149. Hoffman, R. 1927. Birds of the Pacific states. Houghton Mifflin Co., Boston. **Notes**: Author includes information on habitat, call, behavior, general description, nests, eggs, and distribution of subspecies *Oreortyx pictus confinis, O. p. plumifera,* and *O. p. picta.*

150. Holman, J. A. 1961. Osteology of living and fossil New World quails (Aves, Galliformes). Bull. Fla. State Mus. Biol. Sci. 6(2):131-233.

151. Holman, J. A. 1964. Osteology of gallinaceous birds. Q. J. Fla. Acad. Sci. 27:230-252. **Excerpt**: During a recently published study of postcranial osteology of fossil and living New World quails (Holman, 1961), skeletons of representatives of the families of galliform birds were examined in order to ascertain the status of the New World quails. It then became evident that in many cases the relationships between gallinaceous groups were reflected by the postcranial skeleton. At the present time I feel that it is best to retain the New World quails as a subfamily of the Phasianidae because of the characters that are shared with the grouse, pheasants, junglefowl, peacocks, and Old World quails. The Odontophorinae comprise the phasianid group that departs most radically from the cracid-like skeleton, although some parallel developments have taken place in the Old World quails of the subfamily Phasianinae.

152. Howard, H. 1962. Bird remains from a prehistoric cave deposit in Grant County, New Mexico. Condor 64:241-242. **Notes**: Mountain quail (*Oreortyx picta*) bones were collected from a cave on the north side of Howell's Ridge, Little Hatchet Mountains, Grant County, New Mexico. The bones were in Quaternary deposits.

153. Howard, H., and A. H. Miller. 1933. Bird remains from cave deposits in New Mexico. Condor 35:15-18. **Notes**: Authors identified remains found in cave deposits in the Pyramid Peak range, Organ Mountains of Dona Ana County, New Mexico. Mountain quail bones were found in Conkling Cavern and Shelter Cave from Quaternary deposits. In the accompanying table, *Oreortyx picta*, Plumed Quail, are noted as found in Shelter Cave and Rocky Arroyo.

154. Howell, A. B. 1917. Condition of game birds in east-central California. Condor 19:186-187. **Excerpt**: Most of my time during both years was spent at points between eight and nine thousand feet in altitude, which was an excellent location for both quail (*Oreortyx p. plumifera*) and grouse (*Dendragapus o. sierrae*). In

1914, both species were well represented, and although by no means common, especially the latter, both were apt to be encountered during a walk of a couple of miles through their haunts. In 1917, throughout a greater length of time, and during rambles that were of considerably greater extent, I saw neither quail nor grouse. This present scarcity I believe to be due more to the severe winter than to human agencies, for both birds make decidedly hard hunting. At least in the locality under consideration, their favorite habitat is in the vicinity of dense aspen thickets, and the tangles of manzanita, hazel and other brush on the dry hillsides and benches of the high Transition Zone, from which they flush to the timbered ravines. Such is the favorite haunt of the quail as well.

155. Hudson, G. E., P. J. Lanzillotti, and G. D. Edwards. 1959. Muscles of the pelvic limb in galliform birds. Am. Midl. Nat. 61:1-67. **Excerpt**: Although some of the appendicular muscles have been studied in a few gallinaceous birds by various investigators, no one has made a systematic attempt to work out in detail the similarities and differences between representatives of the various genera and families. Our study of examples of 25 genera is only a short step toward obtaining an over-all picture of the myology of the pelvic limb in this order. One of the most striking observations in regard to this group involves the similarity in sesamoids between the New World quails *Callipepla*, *Colinus*, *Odontophorus*, and *Lophortyx*, and the Old World partridge *Alectoris*. They not only have the number greatly reduced, but the same three are consistently present, although *Odontophorus* and *Alectoris* may have a fourth (Table II). *Oreortyx*, on the other hand, although otherwise fairly similar to other American quails studied, has 21 supernumerary sesamoids in the pelvic limb. It seems unlikely that this amazing similarity between *Callipepla*, *Colinus*, *Odontophorus*, *Lophortyx*, and *Alectoris* could be due to convergence. This throws considerable doubt on the validity of the Subfamily Odontophorinae and makes the examination of additional genera highly desirable.

156. Hudson, G. E., R. A. Parker, J. Vanden Berge, and P. J. Lanzillotti. 1966. A numerical analysis of the modifications of the appendicular muscles in various genera of gallinaceous birds. Am. Midl. Nat. 76:1-73. **Abstract**: Gross morphology of the wing and leg muscles was studied in representatives of 35 genera, including all families, subfamilies and *Opisthocomus*. A total of 175 items are considered, 82 in the wing and 93 in the pelvic limb. Each genus is compared with all other genera by two methods of numerical analysis, one using conventional correlation coefficients based on equal weighting, and a scoring system based on differential weighting of characters. Results are interpreted as justifying recognition of the Cracoidea for the Megapodiidae and Cracidae. Grouse are placed in the Tetraonidae, and the Phasianidae is considered to include the Odontophorinae, Phasianinae, Meleagridinae, Numidinae, and Pavoninae. *Opisthocomus* appears unrelated to the Galliformes and is separated in the Opisthocomiformes.

157. Hudson, G. E., and C. F. Yocom. 1954. A distribution list of the birds of southeastern Washington. Res. Stud. State Coll. Wash. 22(1):1-56.

158. Huntington, D. W. 1911. Our feathered game: a handbook of North American game birds. Charles Scribner's Sons, New York, N.Y. 396pp.

159. Hurley, J. B. 1926. Birds observed in Idaho, Washington, and Oregon. Murrelet 7(2):35-36.

160. Hurst, G. A., W. R. Davidson, T. DeVos, E. L. Kozicky, and A. D. Peoples. 1993. Strategic plan for quail management and research in the United States: issues and strategies -- releases of pen-raised quail. Pages 178-179 in K. E. Church and T. V. Dailey, eds. Quail III: Natl. Quail Symp. Kans. Dept. Wildl. and Parks, Pratt. **Excerpt**: As northern bobwhite populations declined over the past 3 decades, increasing numbers of quail enthusiasts have resorted to releasing pen-raised quail. Most state game agencies are no longer directly involved with release programs. Nevertheless, many private landowners continue to make releases of pen-raised quail the center of their game-bird management efforts, rather than focus on habitat improvement and limit their quail hunting to what the carrying capacity of the land will provide. The impact of releasing pen-raised quail in the midst of remnant wild quail populations is not understood. Therefore, managers and biologists should strive to err on the conservative side when considering use of pen-raised quail to provide recreational opportunities. The northern bobwhite is a game-bird resource that is treasured by a diverse user group, and should not be put in jeopardy by massive annual releases of pen-raised stock.

161. Idaho Department of Fish and Game. 1978. A plan for the future management of Idaho's fish and wildlife resources. Vol. 1: goals, objectives and policies 1975 - 1990. Id. Dept. Fish and Game, Boise. 170pp. **Notes**: This publication includes information on current mountain quail range and possible impacts of quail harvests. It highlights problems in mountain quail management including riparian habitat destruction and rehabilitation; limited knowledge of distribution, status, and ecological relationships of mountain quail populations; and lack of research into interspecific competition among upland game birds. This plan also includes a table comparing available quail habitat by land ownership, 1975, for each species of quail. Mountain quail have a total of 31,455 acres available under various ownership.

162. Idaho Department of Fish and Game. 1980. Upland Game Species Management Plan: 1981-1985. Boise, Id. 67pp. **Notes**: This report addresses the management problems and possible solutions of Idaho's four quail species as a group. General information is given on the present population status, future objectives, hunting seasons, bag limits, and season length. A possession limit of no more than 2 mountain quail is included within the recommended season framework.

163. Idaho Fish and Game Commission. 1951. Upland game birds of Idaho. 31pp. **Notes**: Includes a physical description, range, nest and young, food and cover, and enemies of the plumed quail.

164. Ingersoll, A. M. 1913. Great destruction of bird's eggs and nestlings in the Sierra Nevada. Condor 15:81-86. **Excerpt**: One nest of Plumed Quail (*Oreortyx p. plumifera*). The nest was evidently destroyed by an animal having sharp claws and long black hair -- presumably a skunk. Sticky pieces of egg-shell were scattered around the nesting hollow.

165. Islam, K. 1989. Taxonomic relationships of mountain quail populations in the Pacific Northwest and bordering states. Unpubl. Rep., Dept. Fish. and Wildl., Oreg. State Univ., Corvallis. 16pp. **Excerpt**: Mountain quail (*Oreortyx pictus*) have decreased in abundance, and contracted in portions of their range in eastern and northern parts of their distribution during the past two decades. It is unclear as to how much of this part of the range the birds were native. Discussions at a meeting held in Boise, Idaho (22-24 June, 1989) included the suggestion that mountain quail may be reintroduced to certain parts of their range from where they have been extirpated. Presumably, chances of successful reintroduction may be enhanced with the use of birds that are taxonomically and ecologically similar to the original inhabitants of a site. Dr. R. Gutiérrez and Mr. L. Brennan will be involved in an ecological assessment of mountain quail habitat. My interest is to address the taxonomic relationship of mountain quail in the northern and eastern parts of its range. Therefore, the purpose of this proposal is to identify locations and methodology for the collection of mountain quail in Oregon, Washington, Idaho, Nevada, and northern California.

166. Jenkins, H. O. 1906. A list of birds collected between Monterey and San Simeon in the Coast Range of California. Condor 8:122-130. **Excerpt**: *Oreortyx p. pictus*. Painted Quail. Most abundant in the Ceanothus thickets at higher altitudes (above 2000 feet). We saw a good many at the head of Big Creek and above camp in Partington canyon. They seldom flew but when hunted the flocks of six or a dozen birds seemed to depend upon escaping among the dark shadows of the underbrush for which they were so well colored. Once I passed within ten feet of a male that was calling softly to a brood of very young chicks. The chicks disappeared among the grass and leaves but the old bird remained motionless until I had gone away. The following morning another male was found leading a brood of young along the trail. In neither case was the female parent seen.

167. Jewett, S. G., and I. N. Gabrielson. 1929. Birds of the Portland Area, Oregon. Pac. Coast Avifauna No. 19. Cooper Ornithol. Club, Berkeley, Calif. 54pp. **Excerpt**: *Oreortyx picta palmeri* Oberholser. Coast Mountain Quail. This species was quite abundant during the period from December, 1904, to January 1907. Jewett collected a representative series in the area now included within the

city limits of Portland. On April 5, 1908, he saw a large covey of newly hatched young in south Portland. During recent years, the species has become much scarcer, and only a remnant of the large number once seen now remains within this district. The creation by the State Game Commission of an upland game preserve bordering the city of Portland on the south will help preserve the species, although most of this area is well settled and over-run with stray cats and dogs. The Mountain Quail is a permanent resident.

168. Jewett, S. G., W. P. Taylor, W. T. Shaw, and J. W. Aldrich. 1953. Birds of Washington State. Univ. Wash. Press, Seattle. 767pp. **Notes**: This text includes a physical description, status, historical and current distribution, and discussion of whether the mountain quail is indigenous to Washington.

169. Johnsgard, P. A. 1970. A summary of intergeneric new world quail hybrids and a new intergeneric hybrid combination. Condor 72:85-88. **Excerpt**: Lophortyx X Oreortyx. The area of geographic overlap between the Mountain Quail (*O. picta*) and the California Quail is considerable and includes much of California, Oregon, and western Washington . . . The earliest record of a hybrid between these species is that of Peck (1911), who described a specimen taken in 1911 in Harney County, Oregon. Hachisuka (1928) provided an illustration of this hybrid specimen. Peterle (1951) published a reproduction of a painting by L. A. Fuertes of a presumable wild hybrid in the collection of L. M. Loomis, the skin of which is no longer extant. There do not appear to be any hybrids between *Oreortyx* and *Lophortyx* produced in captivity, nor are there any naturally occurring or captive-bred hybrids known that involve the Mountain Quail and *Callipepla* or *Colinus*. With the possible exception of the introduced Bobwhite in northern Oregon . . . the current range of the Mountain Quail would preclude any natural hybridization with these species. Interestingly, Holman (1961) suggests that *Oreortyx* may actually be more closely related to *Callipepla* than to *Lophortyx*, which points out the fallacy of distinguishing genera primarily on the basis of crest condition.

170. Johnsgard, P. A. 1971. Experimental hybridization of the New World quail (*Odontophorinae*). Auk 88:264-275.

171. Johnsgard, P. A. 1973. Grouse and quails of North America. Univ. Nebr. Press, Lincoln. 553pp. **Notes**: This text includes information on ecological distribution, adult weights, egg characteristics and incubation periods, relationship of adult female weight to estimated egg and clutch weights, fertility and hatchability of hybrid quail eggs, reported clutch sized under natural conditions, egg hatchability and hatching success under natural conditions, estimates of early brood mortality under natural conditions, population densities in favorable habitats, covey sizes, home ranges, fall and winter age ratios, summary of major male social signals, states and provinces where grouse and quail were legal game in 1970, some estimated recent state and province harvests, relative hunting importance of grouse and quail species, and grouse and quails reported on Audubon Christmas counts,

1957-1968. There is also a paragraph addressing *Callipepla* x *Oreortyx* hybrids. The chapter on mountain quail includes the following sections: other vernacular names, range, subspecies, measurements, identification, field marks, age and sex criteria, distribution and habitat, population density, habitat requirements, food and foraging behavior, mobility and movements, vocal signals, evolutionary relationships.

172. Johnsgard, P. A. 1975. North American game birds of upland and shoreline. Univ. Nebr. Press, Lincoln. 183pp. **Notes**: This text includes information on habitat, food habits, altitudinal migration, nesting habits, water requirements, fall habitat requirements, social behavior, mate selection, nests, breeding, clutch sizes, nest and brood defense, male incubation, and brood tending. Also included are other vernacular names, range, identification, field marks, and age and sex criteria.

173. Johnsgard, P. A. 1988. The quails, partridges, and francolins of the world. Oxford Univ. Press, New York, N.Y. 264pp. **Notes**: The author provides a summary of the taxonomy, distribution, measurements, identification, general biology and ecology, social behavior, reproductive biology, and evolutionary relationships of mountain quail.

174. Johnson, C. A. 1990. Mountain quail habitat use and management in north-central Idaho: research proposal. Bur. Land Manage., Boise, Id. 5pp. **Notes**: This proposal provides rational for the Riggins, Idaho, mountain quail research project. Includes areas of concern, problem analysis, specific goals or objectives, administrative scope, and anticipated funding needs.

175. Johnson, C. A. 1992. Mountain quail fall and winter habitat use and management in north-central Idaho: research proposal. Bur. Land Manage., Boise, Id. 5pp. **Notes**: This proposal provides rational for continuation of the Riggins, Idaho, mountain quail research project. Includes areas of concern, problem analysis, specific goals or objectives, administrative scope, and anticipated funding needs.

176. Johnston, D. W. 1949. Populations and distribution of summer birds of Latah County, Idaho. Condor 51:140-149. **Excerpt**: *Oreortyx picta*. Mountain Quail. Near the county line just below Julietta an adult and approximately fifteen young were observed by Adams and the writer in a road cut on July 4. The adult and an undetermined number of young had double head plumes.

177. Jotter, E. V. 1918. Mountain quail scarce in Trinity County. Calif. Fish and Game 4(1):99. **Excerpt**: A general scarcity of mountain quail is reported in the Trinity National Forest, except at the lower elevations along the Trinity River. This condition is attributed mainly to the heavy snows of the past season, which prevented them from securing the usual amount of food. After the storm numbers of dead birds were found along the trails and roads in our region. The coyote is

also responsible for a heavy annual loss, as it is a well-established fact that great destruction, especially to the young, is due to these animals.

178. Judd, S. C. 1905. The bobwhite and other quail of the U.S. in their economic relations. U.S. Dept. Agric. Bur. Biol. Survey, Bull. 21. 66pp. **Excerpt**: Their [mountain quail] feeding hours are early in the morning and just before sundown in the evening, when they go to roost in the thick tops of the scrub live oaks. Their feeding habits are similar to those of the domestic hen. They are vigorous scratchers. This bird is especially fond of the leaves of clover and other leguminous plants. It feeds also on flowers, being known to select those of Compositae and blue-eyed grass (*Sisyrinchium*). Flowers, leaves, buds, and other kinds of vegetable matter form the 24.08 per cent marked miscellaneous. The food of the mountain quail of the arid regions has been studied in the laboratory of the Biological Survey. The stomachs examined, 23 in number, were collected in California. The food consisted of animal matter, 3 per cent, and vegetable matter, 97 per cent.

179. Kaeding, H. B. 1899. The genus *Junco* in California. Condor 1:79-81. **Notes**: Brief reference is made to *O. pictus* and *O. p. plumiferus* in a discussion of the regions of California together with many other bird species.

180. Kellogg, L. 1911. A collection of winter birds from Trinity and Shasta Counties, California. Condor 13:118-121. **Excerpt**: *Oreortyx picta picta*. Mountain Quail. Quite numerous at Helena on dry, brushy south slopes. Specimens taken, nos. 17299-17302, are distinctly of the coast form.

181. Kellogg, L. 1916. Report upon mammals and birds found in portions of Trinity, Siskiyou, and Shasta Counties, California, with descriptions of a new *Dipodomys*. Univ. Calif. Publ. Zool. 12(13):335-398. **Excerpt**: On July 8, on north fork of Coffee Creek, the writer caught sight of a weasel in pursuit of a mountain quail. The bird was clucking in a distressed manner and evidently leading the enemy away from where her chicks were. When the weasel got her to a safe distance he ran back, jumped over a log, and was seen to make off with a small victim in his mouth. The whole episode did not occupy two minutes and occurred in a clearing in broad daylight.

182. Keyes, C. R. 1905. Some bird notes from the central Sierras. Condor 7:13-17, 42-43. **Notes**: Observations on behavior, egg characteristics, clutch size, laying schedule, and nest location and characteristics. Author notes that more than one egg per day appears in some nests.

183. Kimball, H. H. 1922. Bird records from California, Arizona, and Guadalupe Island. Condor 24:96-97. **Excerpt**: *Oreortyx picta picta*. Mountain Quail. A small flock flushed near Adams, California, in October 1915.

184. Kitchin, E. A. 1922. Nesting notes at Tacoma in 1922. Murrelet 2:13-18. **Excerpt**: On May 23 a Mountain Quail was seen and heard in a bit of brushy land, evidently standing guard over a female on eggs.

185. Kitchin, E. A. 1934. Distributional check-list of the birds of the State of Washington. Northwest Fauna Series, No. 1. Pacific Northwest Bird and Mammal Soc., Seattle. 28pp. **Excerpt**: Mountain Quail (*Oreortyx picta palmeri*). Introduced in western Washington, where they became more than common. Now, as the forests are cut their districts are becoming restricted and their numbers diminishing.

186. Kotok, E. J. 1917. The automobile a factor in game decrease in El Dorado National Forest. Calif. Fish and Game 3:90-91.

187. Kuvlesky, W. P., Jr., B. D. Leopold, P. D. Curtis, J. L. Roseberry, and T. Hutton. 1993. Strategic plan for quail management and research in the United States: issues and strategies -- population dynamics and effects of hunting. Pages 180-181 in K. E. Church and T. V. Dailey, eds. Quail III: Natl. quail Symp. Kans. Dept. Wildl. and Parks, Pratt. **Excerpt**: Despite nearly 70 years of research on quail in North America, we have only a meager understanding of the mechanisms that regulate abundance and productivity of quail populations. Many state agencies and private landowners continue to use guidelines developed by Stoddard (1931) and Rosene (1969). However, many of these recommendations were developed during an era when land-use practices in agriculture and forestry were drastically different from what they are today. The workshop group on Hunting and Population Dynamics reached a consensus that 4 broad areas need to be addressed: (1) standardization of census and population monitoring methods, (2) issues related to maintaining a sustainable harvest of wild quail through hunting, (3) assessment of population response to management actions and fragmentation, and (4) adoption of a proactive philosophy for quail population and habitat management on both public and private lands. Additionally, some issues related to releases of pen-raised quail have a bearing on this workshop session.

188. Lahnum, W. W. 1944. A study of the mountain quail with suggestions for management in Oregon. Ph.D. Thesis, Oreg. State Univ., Corvalis. 127pp. **Note**: Repeated attempts to locate this document have failed. Library personnel at Oregon State University state that this document does not exist. Other sources (M. Pope, pers. comm.) state that Lahnum wrote the thesis, but it was never accepted or finalized. Lahnum never completed the requirements for the degree and the department's only copy of the draft thesis was destroyed in a fire.

189. Larrison, E. J. 1981. Birds of the Pacific Northwest: Washington, Oregon, Idaho and British Columbia. Univ. Press of Id., Id. Res. Found. 337pp. **Excerpt**: Irregular local resident in reduced numbers from northern Washington and northern Idaho (south from the Clearwater River) southward. Introduced into

Vancouver Island. Most numerous in Oregon. Scattered in the Puget Sound region; uncommon, but regular, resident in Kitsap and Mason Counties, Washington.

190. Larrison, E. J., and K. G. Sonnenberg. 1968. Washington birds: Their location and identification. Seattle Audubon Soc. 258pp. **Notes**: Authors include information about mountain quail in Steptoe Canyon along the breaks of the Snake River, Whitman Co., such as habitat requirements, range, native status, and abundance. Also include a summary of the life zones within the state, common species found within each zone, and maps showing the location and extent of each zone.

191. Larrison, E. J., J. L. Tucker, and M. T. Jollie. 1967. Guide to Idaho birds. Vol. 5. J. Id. Acad. Sci. 220pp. **Notes**: Authors discuss native status and historic introductions of the mountain quail in Idaho. Also include information on habitat, eggs, status (extremely local, uncommon to rare), mating and breeding, and food habits. Populations are said to exist from Kendrick to Lewiston, near Lake Waha, along the breaks of the Snake and lower Salmon Rivers, northeast of Boise, near Salmon City, and along the Owyhee Plateau from the Oregon line southeast to Bruneau Canyon.

192. Lawren, B. 1993. The case of the disappearing quail. Natl. Wildlife 31(6):40-43. **Excerpt**: In Idaho, where mountain quail are in serious trouble, new dams and cattle grazing have destroyed river and creekside brush. Now for the good news: Mountain quail in the forests of the Northwest, except in Idaho, appear to be holding their own. . . In the case of the mountain quail, logging activity in some areas is actually creating new habitat in the form of succession brush.

193. Leopold, A. S. 1939. Age determination in quail. J. Wildl. Manage. 3:261-265. **Excerpt**: 1. In most, and probably all, American quail the outer two primaries and the greater upper primary coverts of the juvenal plumage are normally retained through the postjuvenal molt, and are carried through the first year of life. 2. The presence of at least some of these juvenal coverts, which are either buff-tipped or mottled, is the best means of identifying a quail as a young bird. The plain gray adult coverts are acquired during the first postnuptial molt when the bird is a little more than a year old. 3. Juvenal primaries 9 and 10, also carried through the first year, tend to have pointed tips, whereas the adult primaries tend to have rounded tips. Due to intergradation of shape and obliteration of the difference by wear, this character is a less accurate index of age than the coloration of the coverts. 4. In a small percentage of cases, one or several of the juvenal coverts may be prematurely replaced by adult coverts during the postjuvenal molt. This tendency is most marked in the California and Gambel's quails. 5. Rarely, the distal two juvenal coverts and even the outer primaries may be retained through the first postnuptial molt and into the second year of life. This was observed in only two specimens of the California quail, but conceivable may occur in other species.